

## CLAIMS

### WHAT IS CLAIMED IS:

1. An apparatus for use in parallel reaction of materials, comprising:

a base having a plurality of reaction wells formed therein; and

5 a sealing device positioned over the reaction wells for individually sealing each of the reaction wells;

one of the sealing device and the base having chamfered ridges extending generally around a periphery of each of said plurality of reaction wells, the other of the sealing device and the base having a contact surface formed from a material  
10 softer than a material of the chamfered ridges to create a knife-edge seal between the sealing device and the base when the sealing device and the base are forced into contact with one another.

2. The apparatus of claim 1 wherein the base and the sealing device are

15 both formed from metal.

3. The apparatus of claim 1 wherein the base is formed from a material harder than the sealing device.

5 4. The apparatus of claim 3 wherein the base is formed from stainless steel.

5 5. The apparatus of claim 3 wherein the sealing device is formed from a material selected from the group consisting of aluminum, tin, copper, and nickel.

10 6. The apparatus of claim 1 further comprising a cover positioned over the sealing device.

15 7. The apparatus of claim 6 wherein the cover and the base each comprise a plurality of aligned openings for receiving bolts used to attach the cover to the base and force the sealing device into contact with the base.

8. The apparatus of claim 1 wherein the chamfered ridges are machined into the base.

9. The apparatus of claim 1 wherein said plurality of reaction wells comprises 100 or more reaction wells.

5 10. The apparatus of claim 1 wherein each of said plurality of reaction wells comprises a closed lower end and an open upper end for receiving components of the reaction.

10 11. The apparatus of claim 1 further comprising a plurality of liners positioned in each of said plurality of reaction wells.

12. The apparatus of claim 1 wherein each of said plurality of reaction wells has an internal volume of approximately 10 to 500  $\mu$ l.

15 13. The apparatus of claim 1 wherein the base is generally rectangular in shape.

14. The apparatus of claim 1 wherein the base is generally circular in shape.

15. The apparatus of claim 1 wherein the base comprises a plurality of vessels positioned within said plurality of reaction wells, each having an open upper end forming the chamfered ridges of the base.

5 16. The apparatus of claim 15 wherein the vessels are formed from stainless steel.

17. The apparatus of claim 15 wherein each of said plurality of vessels has an internal volume of approximately 10 to 500  $\mu$ l.

18. The apparatus of claim 15 wherein said plurality of vessels comprises 152 or more vessels.

19. The apparatus of claim 1 wherein the sealing device comprises a cover configured for attachment to the base.

20. The apparatus of claim 19 wherein the cover and the base each comprise a plurality of aligned openings for receiving bolts used to attach the cover to the base and force the cover into contact with the upper ends of the vessels.

21. The apparatus of claim 1 wherein the sealing device comprises a plurality of sealing caps for sealing each of said plurality of reaction wells.

22. The apparatus of claim 21 wherein the chamfered ridge is formed in a lower end of the sealing cap.

23. The apparatus of claim 21 wherein the contact surface of the base comprises a plurality of gaskets each positioned around the periphery of one of said plurality of reaction wells.

24. The apparatus of claim 23 wherein the gasket is formed from a material softer than a material of the sealing cap.

25. The apparatus of claim 24 wherein the gasket is formed from copper and the sealing cap is formed from steel.

5 26. The apparatus of claim 21 wherein the sealing cap is spring biased against the base.

27. The apparatus of claim 21 further comprising a plurality of flow through vessels positioned within the reaction wells.

10 28. The apparatus of claim 1 wherein the apparatus is configured for use as a batch reactor.

15 29. The apparatus of claim 1 wherein the apparatus is configured for use as a fixed bed reactor.

30. A parallel batch reactor, comprising:

a base having a plurality openings extending at least partially therethrough;

a plurality of vessels sized for being received in said plurality of openings within the base, each of said plurality of vessels having a closed lower end and an open upper end having a chamfered periphery edge; and

a sealing device formed from a rigid material softer than a material of said plurality of vessels such that said chamfered edges deform the sealing device when the sealing device is forced into contact with the chamfered edges to seal each of the vessels.

31. The apparatus of claim 30 wherein the base is generally circular in shape.

32. The apparatus of claim 30 wherein said plurality of reaction wells comprises 100 or more reaction wells.

